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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of: Hubert MORICEAU et al.

Appln. No.: 10/565,621

Filed: July 25, 2006

For: STACKED STRUCTURE AND
PRODUCTION METHOD THEREOF

Attorney Docket No: 9905/37 (BIF116044US)

Examiner: Reema Patel

Art Unit: 2812

Confirmation No.: 2319

CORRECTED APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This Corrected Appeal Brief is filed in response to the Notification of Non-Compliant Appeal Brief of August 25, 2011.

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REAL PARTY IN INTEREST

The real party in interest is Commissariat a L'Energie Atomique (currently known as Commissariat a L'Energie Atomique et aux Energies Alternatives), the assignee of the above-referenced patent application.

RELATED APPEALS AND INTERFERENCES

This appeal involves the final rejection of all of the pending claims in U.S. Patent Application No. 10/565,621. There are no other related appeals or interferences involving this application or its subject matter.

STATUS OF CLAIMS

Claims 1, 5-8 and 11-16 are pending in the application. This appeal involves all pending claims, which are presently under a final rejection set forth in an Office Action mailed November 23, 2010.

STATUS OF AMENDMENTS

On November 23, 2010, the Examiner issued a final Office Action for the above-referenced application. In the final Office Action, the Examiner objected to the submission of a new drawing figure, FIG. 7, submitted with the amendment and response of July 7, 2010, and objected to the specification amendment proffered to recognize the new drawing figure. The Examiner further rejected claims 1, 5-8, and 11-26 under 35 U.S.C. §112, first paragraph, and rejected claim 26 under 35 U.S.C. §102(b) over U.S. Pat. No. 6,156,215 to Shimada et al.

In response to the Office Action of November 23, 2010, the appellant filed a Notice of Appeal on March 22, 2011. No amendments have been filed subsequent to Office Action of November 23, 2010, and all of the claim amendments previously filed by the appellant have been acted upon by the Examiner during the course of prosecution, as described above.

SUMMARY OF CLAIMED SUBJECT MATTER

The claimed invention relates to the fabrication of microstructures by means of micromachining or chemical processing techniques typically used in microelectronics. These process techniques are well known in the art of microelectronic fabrication and include, for example, deposition of thin film layers, chemical etching of these layers, photolithographic patterning, and the like. The invention relates more particularly to the fabrication of micro-electro-mechanical systems (MEMS). The MEMS can include various sensors and actuators formed during microelectronic fabrication and can include various components such as mobile portions, which can be, for example, membranes or seismic masses. (Substitute Specification, pg. 1, ll.6-15).

A known starting substrate for fabricating MEMS is a silicon-on-insulator (SOI) substrate, which is typically a silicon substrate having a surface layer of silicon and a layer of silicon dioxide below, or “buried,” beneath the surface layer. (Substitute Specification, pg. 1, ll. 16-20). Various techniques are known for producing mobile or deformable mechanical structures of the MEMS by plasma etching the thin surface layer and chemically etching the silicon oxide layer. (Substitute Specification, pg. 2, ll. 18-25).

In the fabrication of a MEMS components, a stacked structure can be formed that can include an SOI substrate. In the fabrication process, the stacked structure is used to form a mobile or deformable portion in which the silicon oxide layer is a sacrificial layer. The specification defines the meaning of the term “sacrificial layer” as part of a stacked structure that can be eliminated during a fabrication process. (Substitute Specification, pg. 2, ll. 26-32, pg. 3, ll. 1-7). A pressure sensor is one example of a device that includes a mobile or deformable structure. (Substitute Specification, pg. 3, ll. 10-11). Another example is an accelerometer in which a portions of the thin layer are joined by a flexible beam. (Substitute Specification, pg. 3, ll. 12-23).

A problem in the prior art MEMS fabrication methods using SOI substrates relates to sticking of the surface layer of the mobile or deformable structure to the underlying substrate. (Substitute Specification, pg. 4, ll. 11-18). To deal with sticking, attention must be paid to the faces of the substrates that are opposite one another in the stacked structure. As stated in the specification,

“[i]n order to avoid these problems of unwanted sticking, it is necessary to take important precautions, which make the freeing process complex, costly and difficult to control. Moreover, for reasons of reliability, such unwanted sticking of facing faces within MEMS components after the components go into service has to be prevented.” (Substitute Specification, pg. 4, ll. 19-25).

The various identified prior art methods of dealing with the sticking problem suffer from one or more of materials incompatibility, complexity, and restrictions as to the range of MEMS components that can be fabricated. (Substitute Specification, pg. 4, ll. 26-32, pg. 5, ll. 1-32, pg. 6, ll. 1-11).

Claim 1 recites a method of fabricating a stacked structure that includes the sequential steps of selecting first and second plates such that a surface portion of the first plate has a roughness such that the surface portion is incapable of sticking to a surface of the second plate.

According to the specification, a standard silicon plate (1) has a surface (2) that is structured to increase the roughness from a first roughness r_2 to a second roughness r'_2 . (0051). FIG. 2 of the applicants' drawing illustrates one type of surface on a first plate (1) that has a structured surface.



Fig.2

This surface, denoted as element 2 in FIG. 2, has a degree of roughness that will depend, “among other things, on the thickness of the intermediate sacrificial layer, the geometrical parameters of the future component with mobile portions, and the stresses in the surface film, for example.” (Substitute Specification, pg. 11, lines 27-31). The specification states that “a surface is regarded as structured when it is essentially incapable of sticking to a predetermined other substrate.” (0024). Various etching methods are described for producing roughness on the substrate surface. (0053-0054).

Claim 1 further recites producing a sacrificial layer on at least a part of the surface of the first or second plate. An example of a sacrificial layer is illustrated in FIG. 3 of the applicants’ drawing.

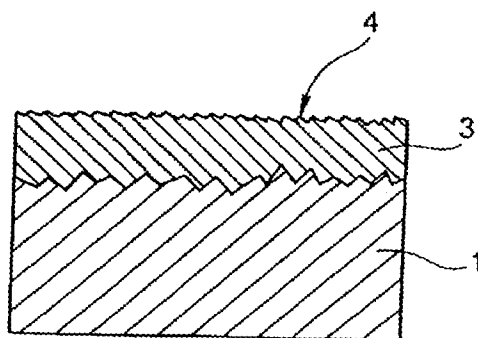


Fig.3

In the illustrated example, the sacrificial layer (3) covers the rough surface of the silicon plate (1). The sacrificial layer (3) has a surface (4) having a roughness r_4 that can be different from the roughness of the underlying silicon plate. (Substitute Specification, pg. 13, ll.1-10). At page 16 of the substitute specification, the inventors also describe that the sacrificial layer can be produced on either the first or second plates. (Substitute Specification, pg. 16, ll. 19-25). Further, the roughness r_4 can be reduced by planarizing the surface (4). (Substitute Specification, pg. 13, ll.11-20).

According to step c) of claim 1, after producing the sacrificial layer, a second plate is bonded to the first plate. As shown below in FIG. 5 of the drawing, the second plate (5) is bonded to the layer (3). The second plate (5) may also have a surface layer (9) of another material that is bonded to the layer (3), preferably by molecular bonding. (Substitute Specification, pg. 13, ll. 21-28).

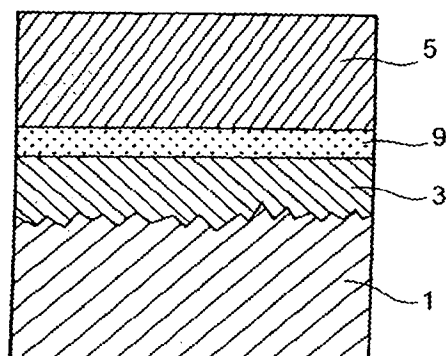


Fig.5

Claim 1 recites an additional step of at least partially eliminating the sacrificial layer to expose the surface portion such that the surface portion at least partially faces the second plate. Although the claim language is such that the steps labeled a), b), and c) are sequential, the additional step can be performed at any point in the recited process.

The claimed method can provide a stacked structure in which two facing surfaces of the first and second substrates contact each other in the absence of the sacrificial layer. (Substitute Specification, pg. 7, ll. 19-25). As described in the substitute specification,

“a portion of the intermediate sacrificial layer between the two plates may be eliminated, for example, to obtain two facing surfaces at least one of which is appropriately structured. This prevents the two surfaces sticking together following movement of the two substrates toward each other.” (Substitute Specification, pg. 7, lines 20-25).

Because the sacrificial layer (3) shown in FIG. 3 above, has been at least partially eliminated, a surface portion of the rough surface (2) shown in FIG. 2 above, faces the other plate. The importance of preventing sticking in SOI structures used in MEMS fabrication and the limitations of prevention methods of the prior art are described in the Background section of their specification. (Substitute Specification, pg. 3, line 29 to pg. 6, line 11).

To at least partially eliminate the sacrificial layer, a method etching the sacrificial layer is described in the context of various embodiments of the invention. For example, with respect to mobile structures in the disclosed devices, the applicants describe that:

“it is perfectly feasible, in a variant of the invention, to place the steps of the method of producing the microstructure, for example the etching of areas in the sacrificial layer in contact with the mobile portions, in the middle of the steps that have just been described, for example before the bonding step.” (Substitute Specification, pg. 14, lines 16-21).

The specification further describes the use of photolithographic techniques to restrict processing to only a portion of the plate.

“The embodiment described above may be modified or generalized in various ways. In particular, the method may relate to the whole or only a portion of the surface of at least one of the plates or one of the films treated. For example, a predetermined structure may be obtained in a localized area using a lithographic process.” (Substitute Specification, pg. 14, lines 29-32; pg. 15, lines 1-3).

The specification also describes that selective processing, such as deposition and etching, is used to selectively process the sacrificial layer.

“It is clear that a non-continuous sacrificial layer may be obtained, for example by localized deposition or by etching; this enables areas already opened up to be defined in the stacked structure.” (Substitute Specification, pg. 16, lines 26-29).

Accordingly, the specification discloses a method of fabricating a stacked structure in which diverse interfaces may be rendered compatible with future MEMS component production steps. In particular, the specification provides a process in which a rough surface that will not stick to a facing surface is provided to improve MEMS production steps.

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

The Examiner rejected claims 1, 5-8, and 11-26 under 35 U.S.C. § 112, first paragraph as failing to comply with the written description requirement. The first issue to be decided on appeal is whether claims 1, 5-8, and 11-26 are unpatentable under 35 U.S.C. § 112, first paragraph.

The Examiner also rejected claim 26 under 35 U.S.C. § 102(b) as being unpatentable over U.S. Pat. No. 6,156,215 to Shimada et al. The second issue to be decided on appeal is whether claim 26 is unpatentable under 35 U.S.C. § 102(b) in view of Shimada et al.

The claims at issue are set forth in the Claims Appendix.

ARGUMENT

I. REJECTION UNDER 35 U.S.C. §112, FIRST PARAGRAPH

A. The Application Reasonably Conveys To Those Skilled In The Art That The Inventors Had Possession Of The Subject Matter Recited By Claim 1 As Of The Application Filing Date

The Examiner has rejected the appellant's claims for allegedly lacking a written description of the subject matter recited by claim 1. In particular, the Examiner alleges that a written description is lacking for the portion of claim 1 that recites "at least partially eliminating the sacrificial layer to expose the surface portion such that the surface portion at least partially faces the second plate." (Office Action,

pg. 4). The appellant asserts that under the jurisprudence of the Federal Circuit, the appellant's specification satisfies the requirements of Section 112, first paragraph.

Section 112, first paragraph, reads as follows:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The Federal Circuit recently reaffirmed that the first paragraph of Section 112 includes both a written description requirement and an enablement requirement. *Ariad Pharm. v. Eli Lilly*, 598 F.3d 1336, 1345, 94 USPQ2d 1161, 1167 (Fed. Cir. 2010, *en banc*). The written description must clearly allow persons of ordinary skill in the art to recognize that the inventor invented what is claimed. *Id.* F.3d at 1351, USPQ2d at 1172. The test for sufficiency of a written description is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date. *Id.* The determination of invalidity for failure to meet the written description requirement is an issue of fact. *Id.* F.3d at 1355, USPQ2d at 1175.

The written description requirement serves the *quid pro quo* of the patent system: a description of the technology is provided in a way that satisfies the inventor's obligation to disclose the technologic knowledge upon which the patent is based and the public receives meaningful disclosure in exchange for being excluded from practicing the invention for a limited period of time. *Capon v. Eshhar*, 418 F.3d 1349, 1357, 76 USPQ2d 1078, 1084 (Fed. Cir. 2005)(citing *Reiffin v. Microsoft Corp.*, 214 F.3d 1342, 1345-46 (Fed. Cir. 2000)("The purpose of the written description requirement "is to ensure that the scope of the right to exclude . . . does not overreach the scope of the inventor's contribution to the field of art as described in the patent specification.")).

While the specification must convey that inventors had possession of the invention, the readers of the specification and the persons who must understand that the inventors possess the invention are those skilled in the art. The court has focused the evaluation of the written description on the understanding of those skilled in the art. *Ariad Pharm. v. Eli Lilly*, F.3d at 1351, USPQ2d at 1172 (“the test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. Based on that inquiry, the specification must describe an invention understandable to that skilled artisan and show that the inventor actually invented the invention claimed.”).

Coupled with the focus on those skilled in the art, the written description varies depending upon the scope of the invention in view of the particular knowledge of those skilled in the art. *Capon v. Eshhar*, *Id.* (“[t]he descriptive text needed to meet these requirements varies with the nature and scope of the invention at issue, and with the scientific and technologic knowledge already in existence.”) The evaluation is not made in a vacuum, the specification is read against the backdrop the knowledge of those working in the field of the invention. The level of detail required to satisfy the written description requirement varies depending on the nature and scope of the claims and on the complexity and predictability of the relevant technology. *Ariad*, *Id.* Accordingly, each case must be evaluated in view of the existing knowledge in the particular field, the extent and content of the prior art, the maturity of the science or technology, and the predictability of the aspect at issue. *Ariad*, *Id.* Importantly, there is no requirement to set forth the disclosure in any particular format, nor is the specification required to recite the claimed invention *in haec verba*.

The appellant asserts that the specification does indeed meet all of the requirements of written description. An objective inquiry of the specification against the backdrop of the knowledge of those skilled in the art of semiconductor fabrication, the maturity of semiconductor processing technology, differences with the prior art of semiconductor fabrication and known processing techniques all clearly

show that the inventors possessed the claimed method at the time of filing both their French priority application and the instant U.S. application.

B. Those Skilled In The Art Will Recognize From The Inventors' Original Claims That The Inventors Had Full Possession Of A Process That Includes At Least Partially Eliminating The Sacrificial Layer To Expose The Surface Portion

Claim 1 recites that the method includes “*a step of at least partly eliminating the sacrificial layer to expose the surface portion such that the surface portion at least partially faces the second plate.*” The Examiner acknowledges that the instant specification contains support for “at least partially eliminating the sacrificial layer so that the plates face each other,” but the Examiner asserts that there is no support for exposing the surface portion (roughened side of first plate). (Office Action, pgs. 4-5). The appellant first points to the certified English translation of its priority French patent application, of record in the instant application and filed on November 14, 2007. Claim element b) of original claim 1 is reproduced below, as it appeared in the appellant’s priority French patent application No. 0308865 and in the corresponding PCT application No. PCT/FR04/01858.

b) a sacrificial layer (3; 8) is produced on at least a portion of the surface (2) of the first plate (1) and/or the surface (7) of the second plate (5)

Thus, the appellant asserts that the original claims recognize that only a portion of the sacrificial layer can be produced on the first or second plate. There is a strong presumption that an adequate written description of the claimed invention is present in the specification as filed. Original claims are part of the specification and can suffice to satisfy the written description requirement. See *Crown Packaging Technology v. Ball Metal Beverage Container Corp.*, 635 F.3d 1373, 1380-81, 98 USPQ2d 1244, 1248-49 (Fed. Cir. 2011)(the original claims were not broad genus claims or function claims and showed that the applicants had in mind the invention as

claimed). See also, *In re Wertheim*, 541 F.2d 257, 262, 191 USPQ 90, 96 (CCPA 1976)(“rejection of an original claim for lack of written description should be rare.”).

The Examiner asserts that the words “at least a portion” do not foreclose the sacrificial layer from residing on the entire first or second substrate. (Office Action, pg. 7, ¶19). The appellant asserts that the specification does not have to describe exactly the subject matter claimed *in haec verba* to satisfy the written description requirement. The requirement is met when the specification clearly allows persons of ordinary skill in the art to recognize that the inventor invented what is claimed. *Vas-Cath v. Mahurkar*, 935 F.2d 1555, 1563, 19 USPQ2d 1111, 1116, (Fed. Cir. 1991). The requirement does not demand that there must be only one possible interpretation of the disclosure to satisfy the written description requirement, as asserted by the Examiner. Indeed there can be alternative interpretations so long as the disclosure reasonable conveys to those skilled in the art that the inventors have possession of the invention. *Fujikawa v. Wattanasin*, 93 F.3d 1559, 1570, 39 USPQ2d 1895, 1904 (Fed. Cir. 1996) (the disclosure need only reasonably convey to persons skilled in the art that the inventor had possession of the subject matter in question). Here, it is clear from their original claim 1 that the inventors conceived and made a constructive reduction to practice of a structure in which the sacrificial layer could only cover part of the first or second plate. In view of the written description provided by the original claims, there is no basis for the instant rejection and the appellant respectfully requests that the rejection be reversed.

C. The Specification Describes Thin Film Fabrication Methods Known To Those Skilled In The Art For Processing The Sacrificial Layer To Remove A Portion And Expose The Underlying Substrate As Recited By Claim 1

The instant specification makes clear that the inventors possessed the claimed invention as of the application filing date. In addition to their original claim, the inventors disclose an embodiment in their original application in which a surface layer has a roughened surface. (Substitute Specification pg. 15, lines 15-20). A

sacrificial layer is deposited over the surface layer, and the sacrificial layer is selectively etched to expose the roughened surface layer. (Substitute Specification pg. 16, lines 3-10). The inventors then describe that this is one embodiment in which the surface of a plate is structured. (Substitute Specification, pg. 16, lines 11-17). The specification further describes that

“[i]t is clear that a non-continuous sacrificial layer may be obtained, for example by localized deposition or by etching; this enables areas already opened up to be defined in the stacked structure.” (Substitute Specification, pg. 16, lines 26-29).

Accordingly, the inventors describe a process embodiment in which the stacked structure is made by bringing the plates together where one of the plates have a surface layer that is exposed by selective etching of the sacrificial layer.

In support of this rejection, the Examiner points to FIG. 4 of the drawing as somehow foreclosing an embodiment in which the sacrificial layer (3) is partially removed to expose the underlying surface prior to bonding the first and second plates together. (Office Action, pg. 5, ¶11, pg. 7-8, ¶20.). Here, the Examiner is improperly restricting the inventors’ written description to a single disclosed embodiment. The appellant asserts that the process illustrated in FIG. 4 is only one embodiment of the disclosed process. This is clear from the specification, in which the inventors refer to “the embodiments described above,” in the context of further described embodiments. (See, for example, pg. 14, ll. 29-32, pg. 16, ll. 11-32, pg. 17, ll. 14-18).

The Examiner specifically asserts that there is no disclosure of a surface portion that is exposed to air or other environment. (Office Action, pg. 4-5, ¶10, pg. 5 ¶11). The Examiner points to the surface smoothing of the silicon oxide layer (3), as illustrated in FIG. 4, and reasons that there is no disclosure of exposing a portion of the underlying plate. (*Id.*). The appellant acknowledges that the surface smoothing process illustrated in FIG. 4 does not disclose exposing the underlying plate. The process described in connection with FIG. 4, is a surface smoothing process that facilitates the bonding of the silicon oxide layer (3) to the second plate (5). As described in the specification, “in certain cases, it may be necessary to modify the

roughness of the surface 4 of the layer 3 to facilitate the subsequent bonding step producing the stacked structure of the invention.” (Substitute Specification, pg. 13, lines 11-14).

The appellant asserts the description of a surface smoothing process of the sacrificial layer (in this embodiment, silicon oxide layer (3)) is not the only processing of the sacrificial layer that is disclosed in the specification. To the contrary, as set forth above, the specification also describes lithographic patterning and selective etching of the sacrificial layer, and selective deposition of the sacrificial layer. Lithographic patterning, etching, and selective deposition are fabrication methods that are well known to those skilled in the thin-film processing arts. The appellant asserts that in rejecting claim 1 for lack of a written description, the Examiner is improperly ignoring the remaining disclosure in the specification. Given the clear disclosure that the process includes multiple embodiments, there is no basis to assert that the inventors were not in possession of the claimed invention as of their original filing date. In view of the written description provided by the specification, there is no basis for the instant rejection and the appellant respectfully requests that the rejection be reversed.

D. The Examiner Improperly Dismissed The Rule 132 Declaration of Dr. Stephan Renaud As Opinion Testimony

The question of whether a specification provides an adequate written description is an issue of fact. *Ariad* at F. 3d at 1355, USPQ2d at 1175. The inventors submitted the declaration of Dr. Renaud as factual evidence to explain why one of ordinary skill in the art would have understood the specification to describe a step of at least partly eliminating the sacrificial layer to expose the surface portion such that the surface portion at least partially faces the second plate. The appellant asserts that it is legal error to dismiss this declaration as only stating conclusions. (Office Action, pg. 6, ¶16). The appellant asserts that the Examiner’s treatment of the declaration is equivalent to dismissing the declaration as merely stating an opinion. As a question of fact, the Examiner must consider evidence of how those skilled in

the art understand the disclosure in the specification. See *In re Alton*, 76 F.3d 1168, 1174, 37 USPQ2d 1578, 1583 (Fed. Cir. 1996)(whether a specification provides an adequate written description of the subject matter of the claims is an issue of fact and it is error for the examiner to dismiss a factual declaration as offering opinion evidence).

In his Declaration, Dr. Renard describes a number of aspects related to MEMS device structure and processing. (Evidence Appendix, Exhibit 1, Renard Declaration, ¶¶ 7-10). Further, Dr. Renard summaries the problems addressed by the disclosed inventive method, and cites several portions of the specification that describe the claimed process. (Renard Declaration, ¶¶ 11-14). Upon review and analysis, Dr. Renard states that the disclosed process results in a situation in which “when the two silicon plates are bonded together, the sacrificial layer will not extend entirely across the interface between the two plates. Because the sacrificial layer is either selectively formed in certain regions, or portions are removed, the silicon surfaces of the plates will be exposed to each other in certain areas of the interface.” (Renard Declaration, ¶ 15). Thus, Dr. Renard concludes that he understands “the meaning of the term ‘faces’ as it appears in the application as describing a situation in which, because at least part of the silicon oxide layer has been removed, and the structured surface of one plate is open to the other plate, without any intervening layer between the two plates.” (Renard Declaration, ¶16). Dr. Renaud demonstrates the basis for his understanding by describing a cantilever portion of an MEMS device described in U.S. Pat. No. 4,653,326. (Renard Declaration, ¶10.) This patent is the U.S. equivalent of French Patent No. 2 681 472 cited and described in the specification. (Substitute Specification, pg. 3, lines 12-23).

As a matter of claim interpretation, the appellant asserts that term “faces” in claim 1 means that at portion the first and second plates are directed toward each other without any intervening structure. As set forth in Dr. Renard’s Declaration, one skilled in the art would understand the meaning of the word “faces” as used in the specification and claims. The phrase “the surface portion at least partially faces the second plate” appearing in claim 1 is understood to mean that the surface portion is

opposite to the second plate and the plates are arranged without any intervening structure, as described above. The appellant asserts that, within the context of the process described and claimed, for the surface portion to “face” the second plate, the surface portion of the first plate is exposed by the partial elimination of the sacrificial layer.

Although the Examiner’s objection to the proposed new drawing figure is not subject to appeal, the figure depicts the described subject matter and is referred to in the Declaration of Dr. Renard. The additional FIG. 7 illustrates the result of partially forming the sacrificial layer (3), or partially removing a portion of the sacrificial layer (3), to form the non-continuous sacrificial layer on the surface (2) of the plate (1). Dr. Renard establishes that one skilled in the art would comprehend the subject matter disclosed the specification to describe the structure illustrated in FIG. 7. (Renard Declaration, ¶¶ 5 et seq.).

It is well established that a claim term is to be accorded “the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313, 75 USPQ2d 1321, 1326 (Fed. Cir. 2005). *Phillips* also indicated that evidence for the meaning of a term may be derived from “the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.” (*Id.* F.3d at 1314, USPQ2d at 1327). The declaration of Dr. Renaud provides factual testimony that addresses how one of ordinary skill in the art understands the disclosure set forth in the specification. This testimony goes directly to the issue of the written description requirement as demonstrates that one skilled in the art understands that the inventors had full possession of the method recited by claim 1. In view of the written description provided by the specification, there is no basis for the instant rejection and the appellant respectfully requests that the rejection be reversed.

II. REJECTION OF CLAIM 26 UNDER 35 U.S.C. 102(b) SHOULD BE WITHDRAWN BECAUSE SHIMADA ET AL. DO NOT DISCLOSE AN EXPOSES ROUGHENED SURFACE PORTION THAT AT LEAST PARTIALLY FACES THE SECOND PLATE

To render a patent claim invalid pursuant to 35 U.S.C. § 102, a single prior art reference must disclose each and every element of the claimed invention. *Lindemann Maschinenfabrik GMBH v. America Hoist & Derrick*, 730 F.2d 1452, 1458, 221 USPQ 481, 485 (Fed. Cir. 1984). Further, anticipation requires the presence in a single prior art disclosure of all of the elements of the claimed invention arranged as in the claim. *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548, 220 USPQ 193, (Fed. Cir. 1983). The phrase “arranged as in the claim” has been interpreted to mean that all of the claimed limitations must be arranged or combined in the same way as recited in the claims. *Net MoneyIN Inc. v. VeriSign Inc.*, 545 F. 3d 1359, 1370, 88 USPQ2d 1751, 1758 (Fed. Cir. 2008). The appellant asserts that pending claim 26 is not anticipated by Shimada et al. at least because this reference does not disclose each and every element of claim 26.

The Examiner asserts that Shimada et al. discloses the structural limitations implied by the method steps of claim 1. (Office Action, pg. 6, ¶15, pg. 8, ¶21). The dents (3) of the first substrate (1) are construed to be a roughen surface, albeit covered by a peeling layer (4). This surface is said to face the second plate (8) in the assembled structure disclosed by Shimada et al. in FIG.1E. The Examiner reasons that if the sacrificial layer is entirely removed then there is no sacrificial layer so the structure disclosed by Shimada et al. anticipates claim 26. Assuming that the sacrificial layer is the peeling layer (4), this layer is not removed, either partially or entirely in the fabrication sequence depicted by Shimada et al. in FIGs. 1A-1E.

Shimada et al. disclose a first substrate (1) having a peeling layer (4) overlying the substrate surface and dents (3) in the surface. A light blocking layer (5) partially covers the peeling layer. A second substrate (8) has a mask layer (10) covering a discontinuous surface, and a bonding layer (7) partially covering the mask layer. In the bonded structure illustrated by Shimada et al. in FIG. 1E, the peeling layer (4) and

the mask layer (10) remain on facing surfaces of their respective substrates. Shimada et al. do not suggest or disclose a structure in which either the peeling layer (4) or the mask layer (10) are at least partially removed to expose a surface portion of the plate, such that the surface portion at least partially faces the second plate (8).

In contrast to Shimada et al., the structure implied by the method steps of claim 26 recites an arrangement in which a sacrificial layer is at least partially removed and an exposed surface portion having a roughness at least partially faces the second plate. Neither of the layers (4) and (10) of Shimada et al. are situated such that the first and second plates face each other with an exposed surface portion. Accordingly, Shimada et al. fail to suggest or disclose a roughed surface portion that at least partially faces a second plate, as recited by claim 26. Since Shimada et al. do not disclose all of the elements of claim 26 arranged as in the claim 26, Shimada et al. does not anticipate claim 26. The appellant respectfully requests that the rejection be reversed.

III. CONCLUSION

For the reasons set forth above, it is submitted that claims are not invalid for failure to meet the written description requirement of Section 112. Further, claim 26 is not anticipated by Shimada et al. Accordingly, these rejections are improper and the appellant respectfully requests that they be reversed.

Respectfully submitted,

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CLAIMS APPENDIX

1. A method of fabricating a stacked structure comprising the following sequential steps:

a) selecting a first plate and a second plate such that a surface portion of the first plate has a roughness such that the surface portion is incapable of sticking to a surface of the second plate,

b) producing a sacrificial layer on at least a part of the surface of the first plate or the surface of the second plate, and

c) bonding the first and second plates together,
the method further comprising a step of at least partly eliminating the sacrificial layer to expose the surface portion such that the surface portion at least partially faces the second plate.

5. The method according to claim 1 wherein selecting a first plate and a second plate further comprises forming the surface having a roughness by increasing the roughness of the selected first or second plate to greater than approximately 0.2 nm root-mean-square (RMS).

6. The method according to claim 1 wherein selecting comprises selecting a least one of the plates that initially includes a surface layer.

7. The method according to claim 6, wherein selecting further comprises selecting at least one of the plates wherein the surface layer comprises a monocrystalline surface layer.

8. The method according to claim 6 wherein selecting further comprises selecting at least one of the plates wherein the surface layer comprises silicon.

11. The method according to claim 1 further comprising forming a surface layer comprising silicon nitride on one of the first or second plates.

12. The method according to claim 1 further comprising smoothing at least one of a free surface of the sacrificial layer or a free surface of at least one of the plates before the bonding.

13. The method according to claim 1 further comprising smoothing the free surface of the sacrificial layer and the free surface of at least one of the plates before the bonding.

14. The method according to claim 1 wherein bonding comprises molecular bonding.

15. The method according to claim 1 wherein bonding comprises bonding with a sacrificial bonding agent.

16. The method according to claim 1 wherein bonding further comprises bonding assisted by at least one of a mechanical means, a plasma treatment, or a thermal treatment.

17. The method according to claim 1 wherein the method further comprises applying a selected atmosphere before bonding.

18. The method according to claim 16 wherein assisting further comprises applying a selected atmosphere during bonding.

19. The method according to claim 16 wherein bonding further comprises exposing the two plates to an open air environment before bonding.

20. The method according to claim 16 wherein bonding further comprises bonding in an open air environment.

21. The method according to claim 1 further comprising thinning at least one of the first or second plates after bonding.

22. The method according to claim 1 wherein a major portion of at least one of the plates comprises a semiconductor material.
23. The method according to claim 22 wherein the major portion comprises silicon.
24. The method according to claim 1 wherein the sacrificial layer comprises silicon oxide.
25. The method according to claim 1 wherein the sacrificial layer comprises a polymer.
26. A stacked structure fabricated by a method according to claim 1.

EVIDENCE APPENDIX

Declaration of Dr. Stéphane Renard with Exhibits A-E.